

Appendix G

Summary of Changes Since the *State Energy Data Report 1996*

Modifications to the Combined State Energy Data System (CSEDS) that are incorporated in this edition of the *State Energy Data Report (SEDR)* are summarized in this appendix. The constraint of page size in *SEDR* does not allow for all 38 years of CSEDS data to be included in the published tables. Data for selected years from 1961 through 1984 are not shown in the report tables but are included in the data files and ASCII-formatted tables available via the Internet and are covered by this section of documentation.

Renewable Energy Sources

Biomass

Residential Sector, 1960 through 1996. Estimates of residential wood consumption for 1960 through 1989 have been added in this update of CSEDS. The additional data, ranging from a total of 1 trillion Btu to 3 trillion Btu each year, increase U.S. total residential energy consumption by 8 percent in 1960, 7 percent in 1961, 5 percent or 6 percent in 1962 through 1965 and 1979 through 1989, and by 3 percent or 4 percent in the other years, with the exception of a 2-percent increase in 1973. The additional wood consumption causes all States' residential energy consumption to increase by at least 1 percent, with the exception of Hawaii, which is estimated to have no wood consumption, and the District of Columbia, which has very little. The largest impacts of the additional data occur in the southern States in the 1960's. Residential energy consumption estimates in Mississippi, Arkansas, and South Carolina increase by 17 percent to 46 percent in 1960 through 1965 and from 8 percent to 18 percent in 1966

through 1969. The largest residential consumption increases range between 6 percent and 15 percent in the 1970's with some New England States among the States with the largest increases. In the 1980's, the additional wood data cause residential consumption to increase by as much as 11 percent and the States most affected were throughout the country including California, Maine, Mississippi, and New York.

Although the U.S. total estimates of residential wood consumption for 1990 through 1996 are not revised, State values are redistributed due to revisions in the U.S. Department of Commerce, Bureau of the Census Housing Units data used to allocate the U.S. total to the States. All States' revisions are by 1 percent or less with the exception of a 3-percent decrease in wood consumption in Alaska in 1993 through 1996.

Commercial Sector, 1960 through 1984 and 1993 through 1996. Estimates of commercial wood consumption for 1960 through 1984 have been added in this update of CSEDS. The additional data increases U.S. total commercial energy consumption by less than 0.3 percent each year. The additional data causes most States' commercial energy consumption to increase by less than 0.5 percent; the largest State increase is by 1.6 percent in Mississippi in 1960.

Although the U.S. total estimates of commercial wood consumption for 1993 through 1996 are not revised, the State values are allocated by a different estimation methodology. The U.S. totals are no longer allocated to the States in proportion to the commercial sector distillate fuel consumption. Commercial sector wood is now allocated in proportion to the State-level residential wood consumption. This revision causes all States' commercial wood consumption to be revised by at least 4 trillion Btu, with

the exception of Delaware in 1996 where the revision is too small to be seen in the level of rounding in *SEDR* tables. Commercial wood consumption estimates in Alabama, Arizona, California, Louisiana, Mississippi, Oklahoma, and Washington more than double or triple for the 1993 through 1996, while many States' estimates are revised by at least 50 percent.

Industrial Sector, 1960 through 1996. Estimates of industrial wood and waste consumption for 1960 through 1989 have been added in this update of CSEDS. The additional data increase U.S. total industrial energy consumption by 3 percent or 4 percent in the 1960's, 4 percent in the 1970's, and 5 percent to 7 percent in the 1980's. The additional wood and waste data cause total industrial energy consumption increases in most States, the largest being 17 percent to 46 percent increases in Vermont, Maine, New Hampshire, Oregon to increase by in 1960 through 1979. During the 1980's the impact of the additional wood and waste data is greater, with Maine industrial consumption more than doubling and the other States' industrial consumption increasing by 30 percent to 70 percent. Industrial consumption estimates are not revised in Delaware, the District of Columbia, Nevada and North Dakota because it is estimated that there is no wood consumed in the industrial sectors of those States.

Estimates of industrial sector wood and waste consumption for 1990 through 1996 are revised due to revisions in the nonutility consumption data and by a refinement to the estimation methodology for manufacturing use of wood and waste. The allocating data series that distributes the U.S. total manufacturing wood and waste to the States now contains a measure for use of waste in the food products industries, such as sugar cane processing and corn milling. The inclusion of these measures causes estimates of industrial wood and waste consumption for all States to be revised for 1990 through 1996, most significantly in Iowa, Indiana, and Kansas where it more than doubles.

Transportation Sector, 1989. Estimates of ethanol use in the transportation sector for 1989 are added to this update of CSEDS. This series is for information only and the addition does not change total transportation energy consumption. Quantities of ethanol consumed are included in the motor gasoline data.

Electric Utilities, 1990 through 1992 and 1994 through 1996. Electricity produced from wood and waste sources is converted from kilowatthours to

British thermal units (Btu) by use of a conversion factor, the U.S. average heat content of fossil fuels burned at steam-electric power plants, FFEOKUS. Although electricity generation from wood and waste by electric utilities is not revised, the equivalent values in Btu are revised due to changes in the conversion factor. The Btu values in all States for 1990 through 1992 and 1994 through 1996 are revised by the percentages shown in Table G1.

Geothermal Energy

Residential, Commercial, and Industrial Sectors, 1989 through 1996. Estimates of geothermal energy use, both direct use and by use of heat pumps, in the residential, commercial, and industrial sectors for 1989 forward have been added to this update to CSEDS. The additional geothermal energy increases U.S. total residential energy consumption by 5 trillion Btu in 1989 to 7 trillion Btu in 1996, which represent less than 0.05 percent of total residential consumption. The additional geothermal data increases U.S. commercial energy consumption by 3 trillion Btu in 1989 to as much as 5 trillion Btu in 1996, which are equivalent to less than 0.05 percent of total commercial energy consumption each year. The additional geothermal data increases U.S. industrial sector total energy consumption by 2 trillion Btu to 3 trillion Btu in 1989 through 1996, which represents 0.01 percent of the industrial consumption. Nevada and Wyoming are the only two States noticeably affected by the additional geothermal data; Wyoming's commercial sector energy consumption increases by 2 percent in 1989 through 1996 while Nevada's commercial sector consumption increases by 1 percent.

Table G1. Revisions to Fossil-Fueled Steam-Electric Plants Thermal Conversion Factors

Year	Previous	Current	Percent Change
1990	10,399	10,402	0.03
1991	10,425	10,436	0.11
1992	10,340	10,342	0.02
1994	10,309	10,316	0.07
1995	10,304	10,312	0.08
1996	10,338	10,335	-0.03

Electric Utilities, 1989. Estimates of electricity generated from geothermal energy and imported from Mexico into California in 1989 are identified separately to this update to CSEDS. The data had previously been included in total electricity imports and assumed to be hydroelectricity.

Hydroelectric Power

Industrial Sector, 1989 through 1996. Estimates of hydroelectricity used by nonutility power producers in 1989 have been added to this update of CSEDS causing the U.S. total industrial hydroelectricity use to more than double and revisions by more than 20 percent to all 31 States with estimated industrial hydroelectricity use. For 1990 through 1996 there are small adjustments to the estimates of hydropower used by nonutility power producers. All of the revisions are by 1 percent or less and most are too small to be seen in *SEDR* tables due to the level of rounding.

Electric Utilities, 1989 through 1992 and 1994 through 1996. Imports of electricity generated from hydropower in 1989 are revised in this update of CSEDS. In previous versions, it was assumed that all electricity imports for 1960 through 1989 were generated from hydropower. In this version of CSEDS 1989 electricity imports are estimated using the same methodology as the imports for 1990 forward. This methodology breaks out geothermal-based imports from Mexico into California, and nonrenewable-based electricity imports for other States. The change in methodology causes 1989 hydroelectricity imports in California to decrease by 53 percent, Texas imports to decrease to zero, and hydroelectricity imports into the other 16 States affected to decrease by 21 percent.

Although there are no revisions to 1990 through 1992 and 1994 through 1996 electricity generation by electric utilities from hydropower in kilowatthours or to imports and exports of hydroelectricity in kilowatthours in this edition of CSEDS, the heat rate conversion factor used to convert the kilowatthours to Btu is revised. This factor, FFEOKUS, is the annual average heat rate factor for fossil-fueled steam-electric power plants. The Btu values for hydroelectric power in all States and the U.S. total for 1990 through 1992 and 1994 through 1996 are revised by the percentages shown in Table G1.

Solar

Residential/Commercial Sector, 1989. Estimates of residential sector (including the commercial sector) use of solar energy for 1989 are added to this update of CSEDS increasing 1989 residential energy consumption by 47 trillion Btu (0.3 percent). The largest impact on total residential sector energy consumption occurs in Florida and Hawaii where consumption increases by 3 percent due to the additional solar data.

Industrial Sector, 1989 through 1996. Electricity generation from solar energy by nonutility power producers in California in 1989 is included in this update of CSEDS. The 5 trillion Btu represents 0.3 percent of California's total industrial energy use. California's nonutility solar energy estimates for 1990 through 1996 were revised by the EIA originating office and all changes are by less than 1 percent.

Electric Utilities, 1990 through 1992 and 1994 through 1996. Although there are no revisions to electricity generation by electric utilities from solar energy in kilowatthours in this update of CSEDS, the heat rate conversion factor used to convert the kilowatthours to Btu is revised. This factor, FFEOKUS, is the annual average heat rate factor for fossil-fueled steam-electric power plants. Solar energy is used by electric utilities in California, Texas, and Virginia. The Btu values for solar-based electricity generation in those States and the U.S. total are revised by the percentages shown in Table G1.

Wind

Industrial Sector, 1989 through 1996. Electricity generation from wind energy by nonutility power producers in California and Hawaii in 1989 has been added to this update of CSEDS increasing total U.S. industrial energy use by 19 trillion Btu (less than 0.1 percent). California's industrial energy consumption increased by 1 percent while Hawaii's industrial sector increased by 0.3 percent due the additional wind data. Estimates for industrial wind energy in 1990 through 1996 were revised by the EIA originating office and all State revisions are by less than 1 percent.

Electric Utilities, 1990 through 1992 and 1994 through 1996. Although there are no revisions to electricity generated from wind energy by electric utilities in kilowatthours, the heat rate conversion factor used to convert the kilowatthours to Btu is revised. This factor, FFEOKUS, is the annual

average heat rate factor for fossil-fueled steam-electric power plants. The Btu values for wind-generated electricity in California, Iowa, Kansas, Minnesota, Montana, and Wisconsin, as well as the U.S. total are revised by the percentages shown in Table G1.

Electricity Sales

Transportation and Commercial Sectors 1960 through 1996. The methodology for estimating transportation use of electricity by State is revised in this update of CSEDS. Previously, a State data series of electricity used by transit systems from the U.S. Department of Transportation was adjusted by a national level series from an EIA publication on financial statistics of major electric utilities. In this update, the Department of Transportation data are used directly without adjustment for 1960 forward. This causes all States' transportation electricity use to be revised by the same percentage which varies from year to year. The State estimates decrease by as much as 11 percent (in 1961) and increase by as much as 29 percent (in 1995). Commercial use of electricity is adjusted by the changes in the transportation data and State total electricity consumption remains the same. The commercial sector revisions are by 1 percent or less in all States and years with the exception of New York where commercial sector electricity use increases by 2 percent in 1961 and 1962.

Electrical System Energy Losses, 1989 through 1996

Electrical system energy losses are estimated at the national level and allocated to the States in proportion to electricity sales. Electricity sales are revised in the transportation and commercial sectors for all States in 1960 through 1996. These revisions cause the electrical system energy losses to

be revised by the same percentages as the electricity sales (see previous page). The revisions to the fossil-fueled steam-electric power plants factor also affect estimates of electrical system energy losses as can be seen in the small revisions in the residential and industrial sector losses for all States in 1990 through 1992 and 1994 through 1996. These revisions are by 0.03 percent or less for all States and are too small to be seen in the level of rounding in the *SEDR* tables although they may be seen in the data files available from the Internet.

New Interstate Flow of Electricity, 1990 through 1992 and 1994 through 1996

The revisions to the fossil-fueled steam-electric power plants factor (See Table G1) also affect estimates of net interstate flow of electricity between States. States with greater electric utility use of hydropower, wood, waste, wind and solar energy have larger revisions in their estimated electricity interstate flow. Most States' revisions are by less than 1 percent. The exceptions are Delaware in 1991, Iowa in 1994 and 1995, Maine in 1991 and 1996, Michigan in 1996, Oregon in 1991 and 1995, South Dakota in 1990, 1991, and 1992, Texas in 1994 and 1995, and Washington in 1990, 1991, and 1995.

Population, 1991 through 1996

The U.S. Department of Commerce, Bureau of the Census, revised the resident population series for 1991 through 1996. The revisions are by less than 1 percent in all States and years. These population estimates, which are used in the calculation of the data shown in the "Total Energy per Capita" ranking column of Table 9, are shown in Appendix D, and are included in the Internet data files.